Public Works & Utilities

Unpaved Streets & Enhanced Pavement Mitigation

CITY OF WICHITA
www.wichita.gov

May 19, 2015

Background

- City Council strategic planning effort in 2014 addressed unpaved streets & mitigation of paved streets
- Council asked for options to address unpaved streets
- Latest life cycle model identified need to supplement approach with mitigation alternatives of below acceptable service level

Unpaved Streets

- Approximately 167 unpaved lane miles in Wichita
- More than 90% are residential neighborhood streets

Unpaved Streets

- Historically, paved almost exclusively by petition, although the City Council does have the authority to require it
- In either case, virtually all associated costs are borne by property owners within the benefit district

Unpaved Streets - Dust

- The fine material necessary to bind gravel surfaces together gives rise to dust
- The City has considered providing dust control in the past, but the cost proved prohibitive
- State and County health officials advise that road dust is unregulated in Kansas and has not been deemed a health issue

Unpaved Streets - Dust Control

- Among numerous alternative dust suppressants, magnesium chloride ($MgCl_2$) appears the most cost effective and frequently used in rural areas
- Unpaved streets within 100’ of schools may be a point of emphasis
- Regular grading (to ensure a smooth surface) diminishes the effectiveness of treatment. Over the last 5 years, unpaved streets were graded an average of 13 times during the school year

Unpaved Streets - Dust Control

- City could outsource $MgCl_2$ treatment concurrent with in-house grading operations
- Recommended application rate is 0.5 gal/sy, at an approximate cost of $1.16/gal

Unpaved Streets - Paving

- The City's current minimum paving standard has long been considered an appropriate balance of both initial construction and long-term maintenance expenses
- Any one or more of its essential components may be diminished in order to reduce the initial, one-time cost of construction

Unpaved Streets - Paving

Residential Street Alternative	Improvement			Total Cost/LF	Estimated Service Life (Residential)
	Foundation	Drainage	Pavement		
Minimum City Standard	A	A	A	$215.00	25-30 years
Asphalt Mat	A	C	A	$154.25	15-20 years
Improved Double Chip Seal	B	B	E	$116.25	3-8 years
Partially Improved Cape Seal	None	C	D	$32.25	0-5 years
Unimproved Double Chip Seal	None	None	E	$12.00	0-5 years

Unpaved Streets - Options

Approximate Costs of Select Improvement Options							
Asset Group	Frequent Chemical Dust Mitigation	City Minimum Paving Standard		Asphalt Mat		Improved Double Chip Seal	
	Cost per Year ($)	Initial Construction Cost ($)	Cost per year of Acceptable Service ($)	Initial Construction Cost ($)	Cost per year of Acceptable Service ($)	Initial Construction Cost ($)	Cost per year of Acceptable Service ($)
Unpaved Streets within ≈ 100' of Schools	78,000	909,000	30,000 to 36,000	652,000	33,000 to 43,000	492,000	62,000 to 164,000
All Unpaved Arterial Collector Streets	722,000	11,600,000	387,000 to 464,000	8,400,000	420,000 to 560,000	3,445,000	431,000 to 1,148,000
All Unpaved Streets	8,900,000	106,200,000	3,540,000 to 4,248,000	76,300,000	3,815,000 to 5,087,000	54,600,0000	6,825,000 to 18,200,000

Unpaved Streets – Alternative Treatment

Program	Crew Members	Life span of treatment (yrs)	Lane miles per year	Dollars per year
In-house Chip Seal Crew	7	1-3	40	$1,450,000

Paved Streets – Mitigation Needs

Maintenance Prioritization		Network Value	Network RSL (Lane Mile Years)	Lane Miles at RSL = 0
2015 Street Network Measurements				
		$444 million	42,213	927
Projected Street Network Measurements in 40 years				
	Traditional Priorities	$80 million	5,524	4,113
$8M	Alternative Priorities (Max ROI)	$458 million	42,898	2,729
$8M	Revised Approach	$507 million	46,252	2,156
$10M	Revised Approach	$548 million	49,641	1,838
$12M	Revised Approach	$583 million	52,363	1,554
$16M	Revised Approach	$646 million	58,722	832
$20M	Revised Approach	$681 million	62,758	486

Paved Streets – Mitigation Needs

Maintenance Prioritization		Lane Miles Treated	Lane Miles NOT Treated	% Lane Miles NOT Treated
$8M	Revised Approach	2,985	2,114	41.5%
$10M	Revised Approach	3,344	1,755	34.4%
$12M	Revised Approach	3,598	1,501	29.4%
$16M	Revised Approach	4,422	677	13.3%
$20M	Revised Approach	4,855	244	4.8%

Paved Streets – Mitigation Options

Program	Crew Members	Lane miles per year	Dollars per year
Spot Repair	5	50	$650,000
Spray Injection Patching	2	200	$115,000

Phase 1 – 2016

Program	Crew Members	Lane miles per year	Dollars per year
Spot Repair	5	50	$650,000
Spray Injection Patching	2	200	$115,000

Phase 2 – 2017

Program	Crew members	Lane miles per year	Dollars per year
Spot Repair	10	100	$1,300,000
Spray Injection Patching	2	200	$115,000

Phase 3 – 2018

Program	Crew Members	Lane Miles per Year	Dollars per year
Spot Repair	10	100	$1,300,000
Spray Injection Patching	2	200	$115,000
In-house Chip Seal Unpaved Arterials & Collectors	7	14	$1,450,000
Paved Street Repair and Surfacing		26	

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Questions?

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Unpaved Streets within 100’ of Schools – Cessna Elementary

Selected Unpaved Street Unpaved Street Paved Street

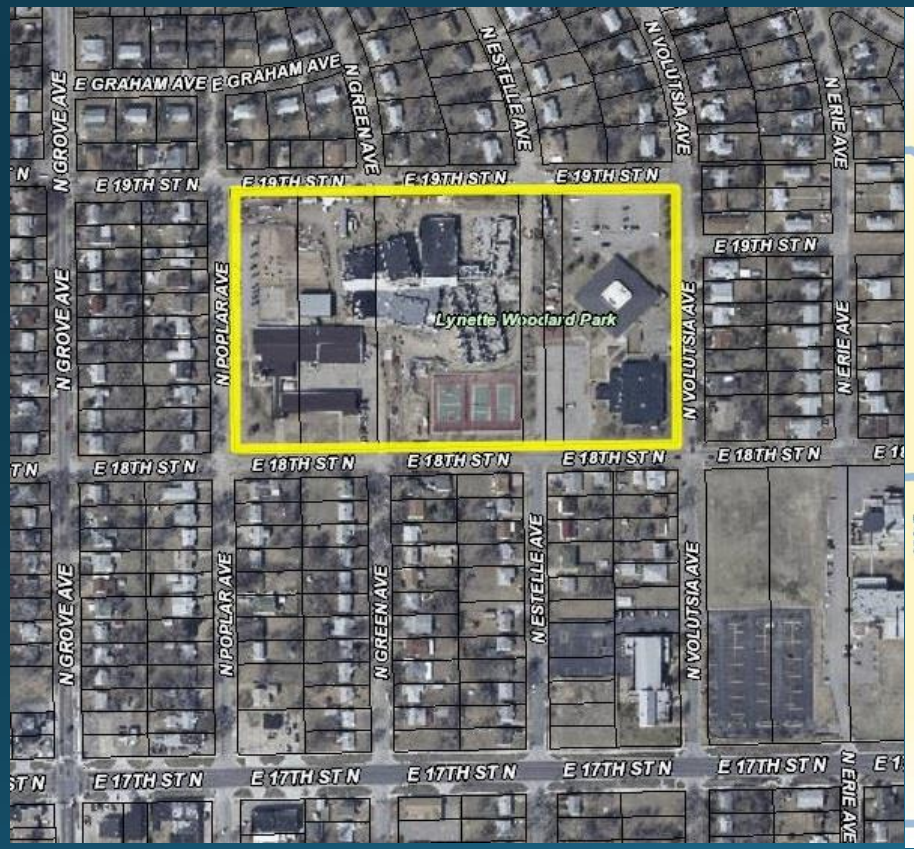
Unpaved Streets within 100’ of Schools – Dodge Edison Elementary

Selected Unpaved Street Unpaved Street Paved Street

Unpaved Streets within 100’ of Schools – Earhart Elementary

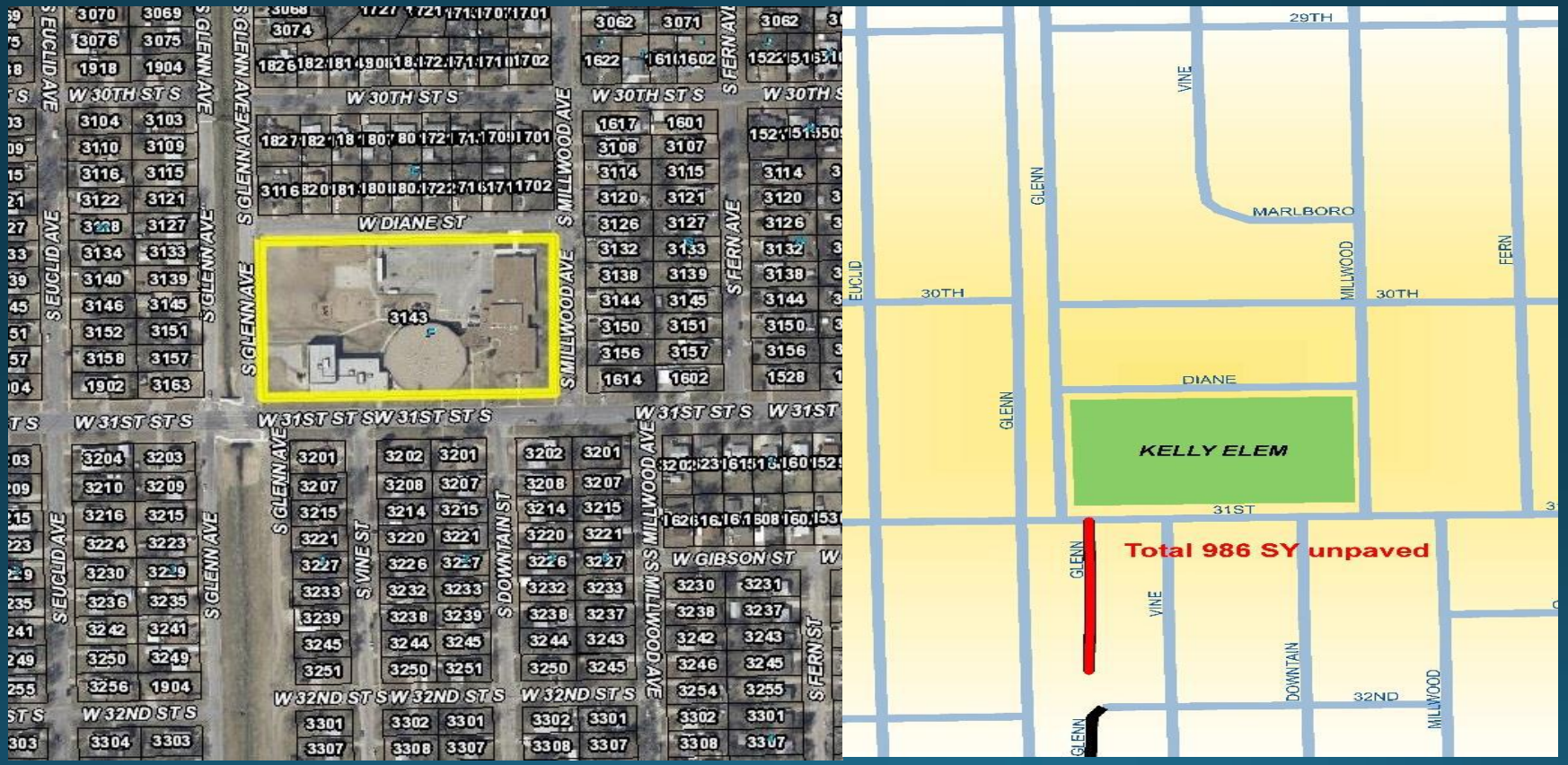
Selected Unpaved Street Unpaved Street Paved Street

Unpaved Streets within 100’ of Schools – Isely Elementary



Selected Unpaved Street **Unpaved Street** **Paved Street**

Unpaved Streets within 100’ of Schools – Kelly Elementary

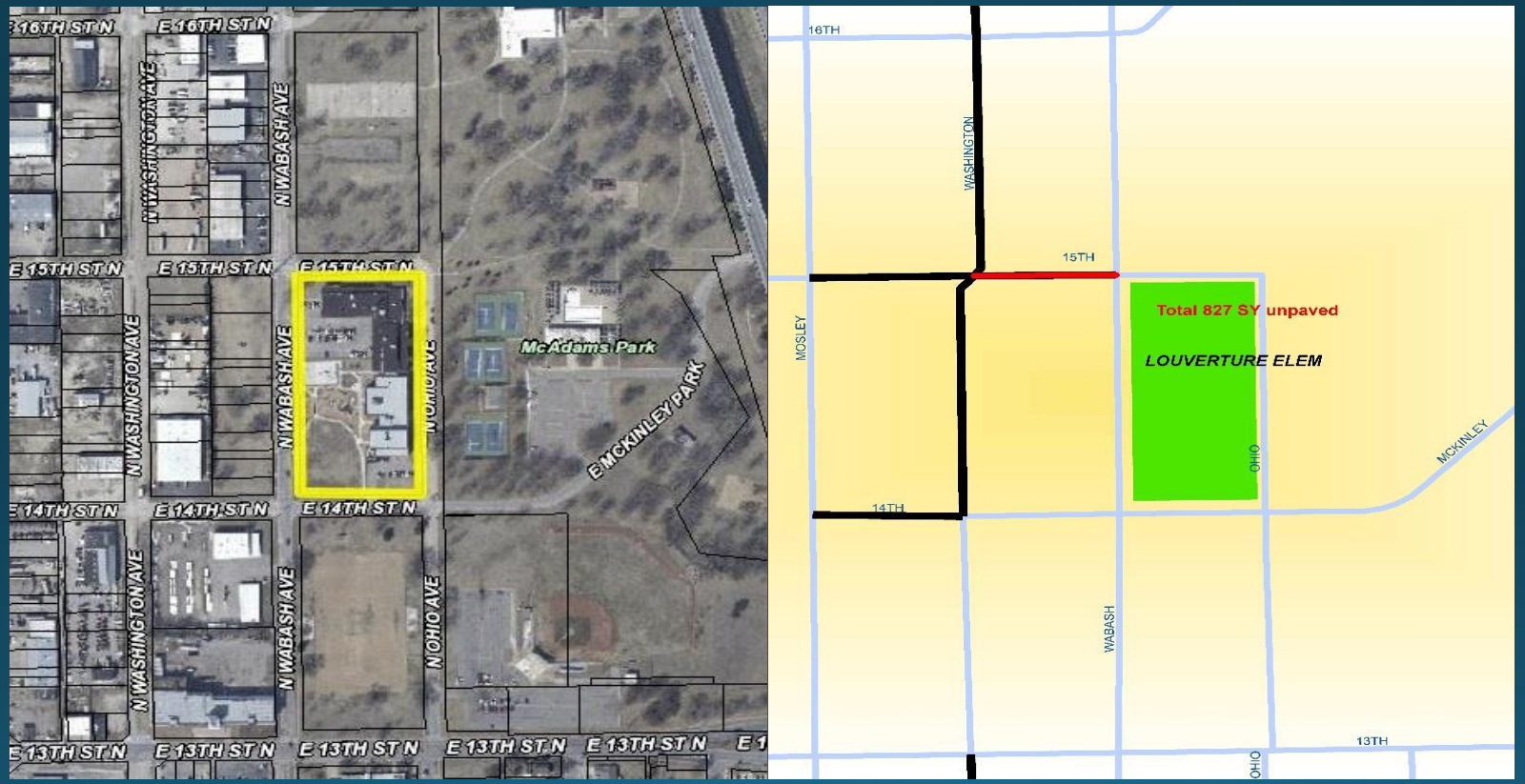


Selected Unpaved Street **Unpaved Street** **Paved Street**

Unpaved Streets within 100’ of Schools – Little Early Childhood Center

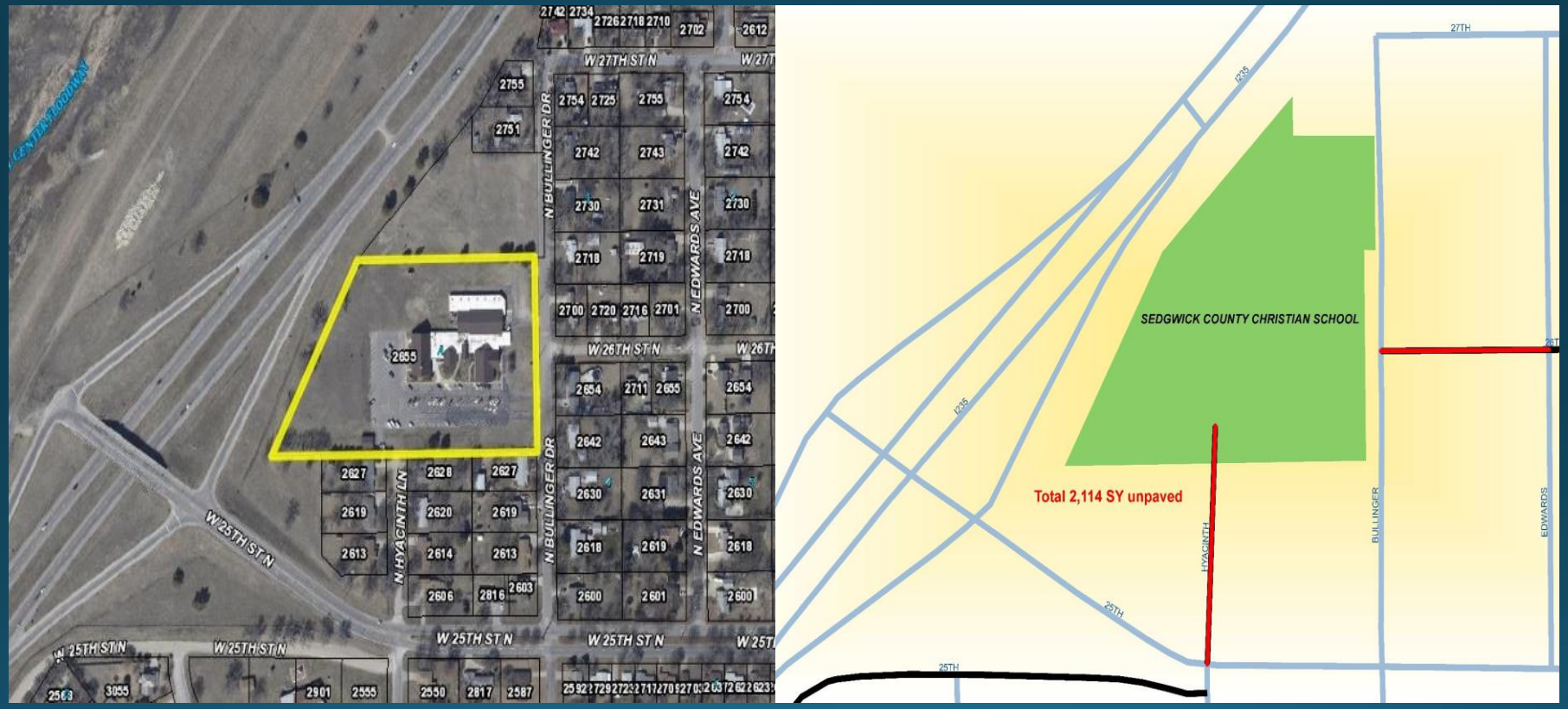
Selected Unpaved Street **Unpaved Street** **Paved Street**

Unpaved Streets within 100’ of Schools – L’Ouverture Elementary



Selected Unpaved Street **Unpaved Street** **Paved Street**

Unpaved Streets within 100’ of Schools – Sedgwick County Christian School



Selected Unpaved Street **Unpaved Street** **Paved Street**